



Dechloromonas: to be or not to be a PAO? That is the question!

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Publication date:
2019

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Petriglieri, F., Singleton, C. M., Gomez, M. P., Petersen, J. F., Nierychlo, M. A., & Nielsen, P. H. (2019). *Dechloromonas: to be or not to be a PAO? That is the question!*. Poster presented at 8th IWA Microbial Ecology and Water Engineering Specialist Conference, Hiroshima, Japan.

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Dechloromonas: to be or not to be a PAO?

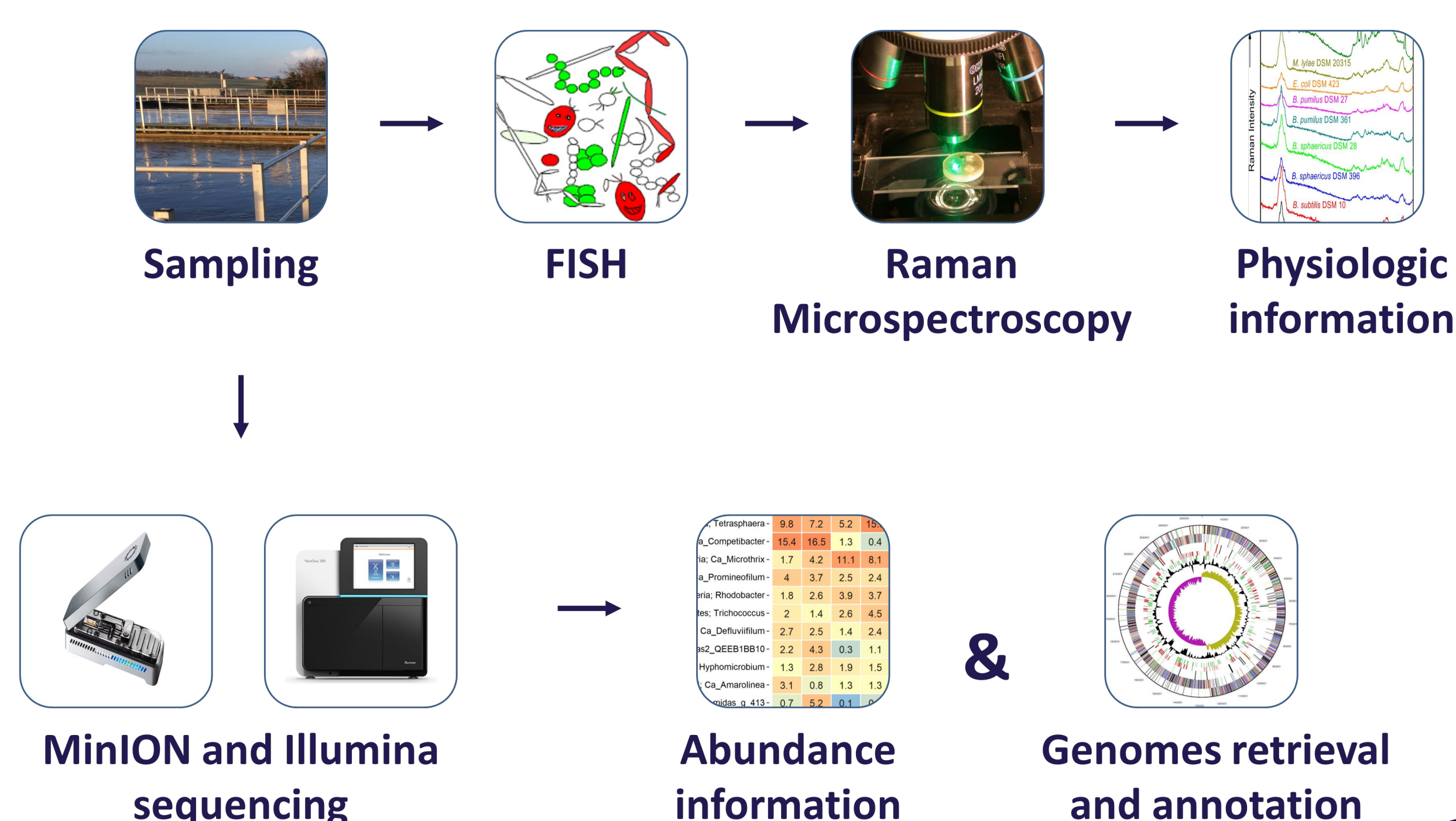
That is the question!

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Background and Methods

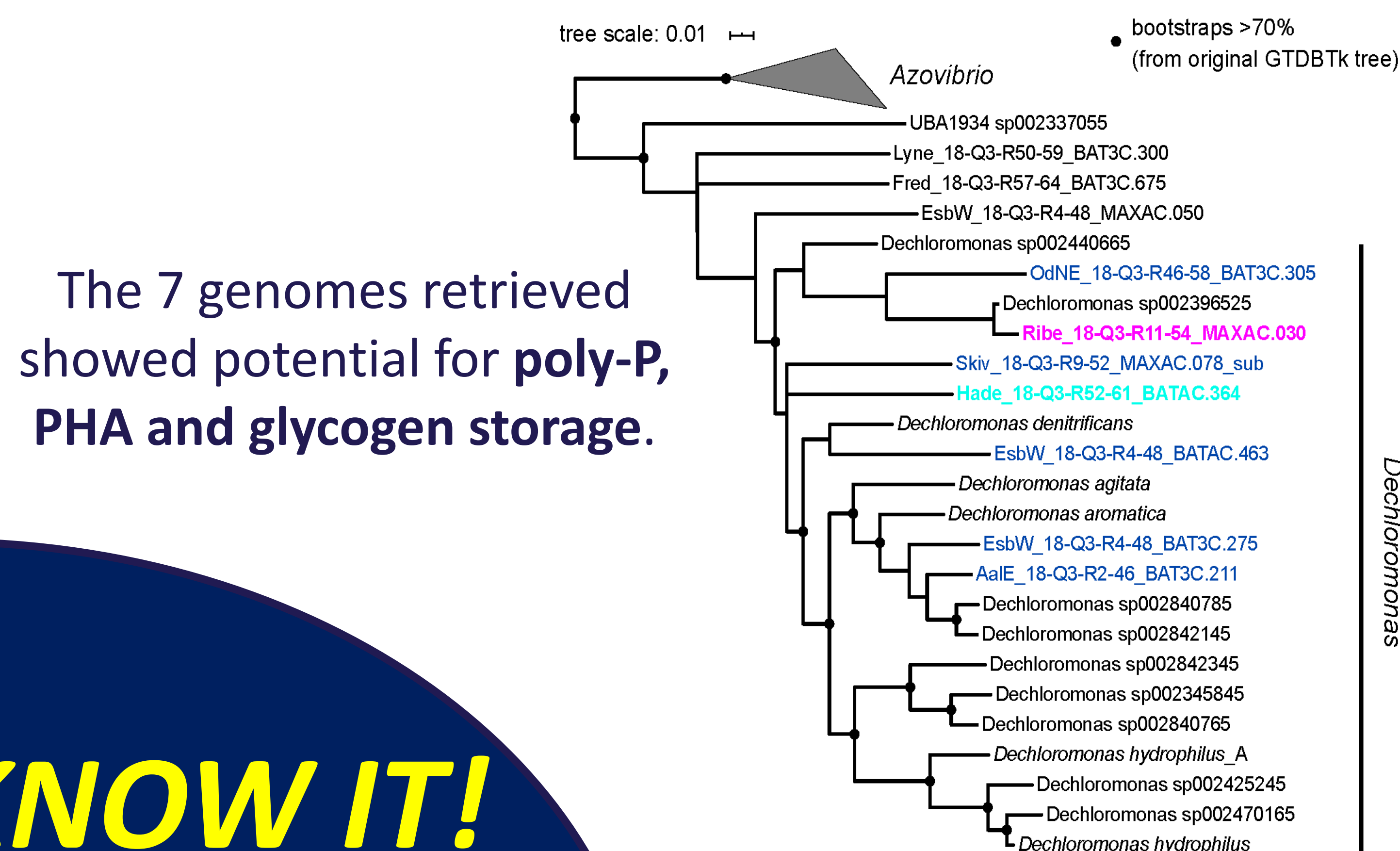
EBPR (Enhanced Biological Phosphorus Removal) is a biotechnological process that relies on the ability of certain microorganisms, called **PAO** (polyphosphate accumulating organisms), to store phosphate intracellularly. Members of the genus *Dechloromonas* are often abundant in EBPR plants worldwide and have long been considered putative PAOs, as **intracellular poly-P** has been identified with traditional staining methods. The **aim of this study** was to determine its metabolic potential, to verify it and define the levels and dynamics of important storage polymers using **metagenomics** and **FISH-Raman** microspectroscopy.



Abundance and metabolic potential

Tetrasphaera	6.6	9.5	5.2	4.4	0.2	3.9	9.4	15	8	12.8	7.4	9.6	3.7	14.8	12.7	21.8	0.1	2.2	9.8	10.1	4.3	5.1	14.8	3.6	7.7	5.7	1.8	7.3	6.9	13.6	8.3	3.9	6.3	5.3	9.5	15.5	4.4	6.1	22
Dechloromonas	2.7	2.3	1.8	1.8	0.1	1.7	2.7	2.9	1.3	2.5	0.8	0.6	0.9	1.3	7.3	1.1	0.2	0.3	0.1	1.6	3.3	1.9	0.6	0.3	0.6	0.9	1	2.1	2.6	1.7	2.2	0.5	4.2	0.8	2.8	0.5	2	3.4	0.2
Ca_Accumulibacter	0.5	1.2	0.4	1	0	0.9	1.1	0.8	0.6	0.9	0.4	0.8	0.6	0.6	1	0.1	0.3	0.5	0.4	0.3	0.4	1.6	0.3	0.5	0.2	1.5	1	0.3	1.4	0.9	1.1	0.4	0.7	0.4	1.1	0.6	1.1	0.5	0.1
Tessaracoccus	0.1	0.3	0.3	0.5	0	0.4	0.5	0.2	0.1	0.5	0.8	2.3	0.5	0.2	0.2	0.3	0.1	0.7	0.6	0.3	0.1	0.2	2.6	0.7	0.6	0.4	0.6	0.4	0.2	0.2	0.3	0.8	0.2	0.5	0.5	0.5	0.7	0.1	0.1
Ca_Obscuribacter	0.1	0.1	0	0.1	0	0.2	0.1	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1	0	0	0	0	0	0.3	0.2	0	0	0	0.1	0.1	0.1	0.2	0	0.1	0.1	0.1	0	0.1	0.1	0.1	0	0
	Avedøre	Bjergmarken	Bjerringbro	Boeslum	CP Kelco	Damhusåen	Egå	Elby Mølle	Esbjerg E	Esbjerg W	Fonæs	Fredericia	Haderslev	Hirtshals	Hjerring	Horsens	Kalundborg	Kerteminde	Kolding	Lundtofte	Lynetten	Marngårdsfjord	Marselisborg	Middelfart	Mørke	Odense NE	Odense NW	Odense R	Ribe	Ringkøbing	Søholt	Viborg	Viby	Aabenraa	Aaby	Aalborg E	Aalborg W	Aars	

Dechloromonas is the **second** most abundant PAO in Danish plants, reaching up to **40%** of the biomass.

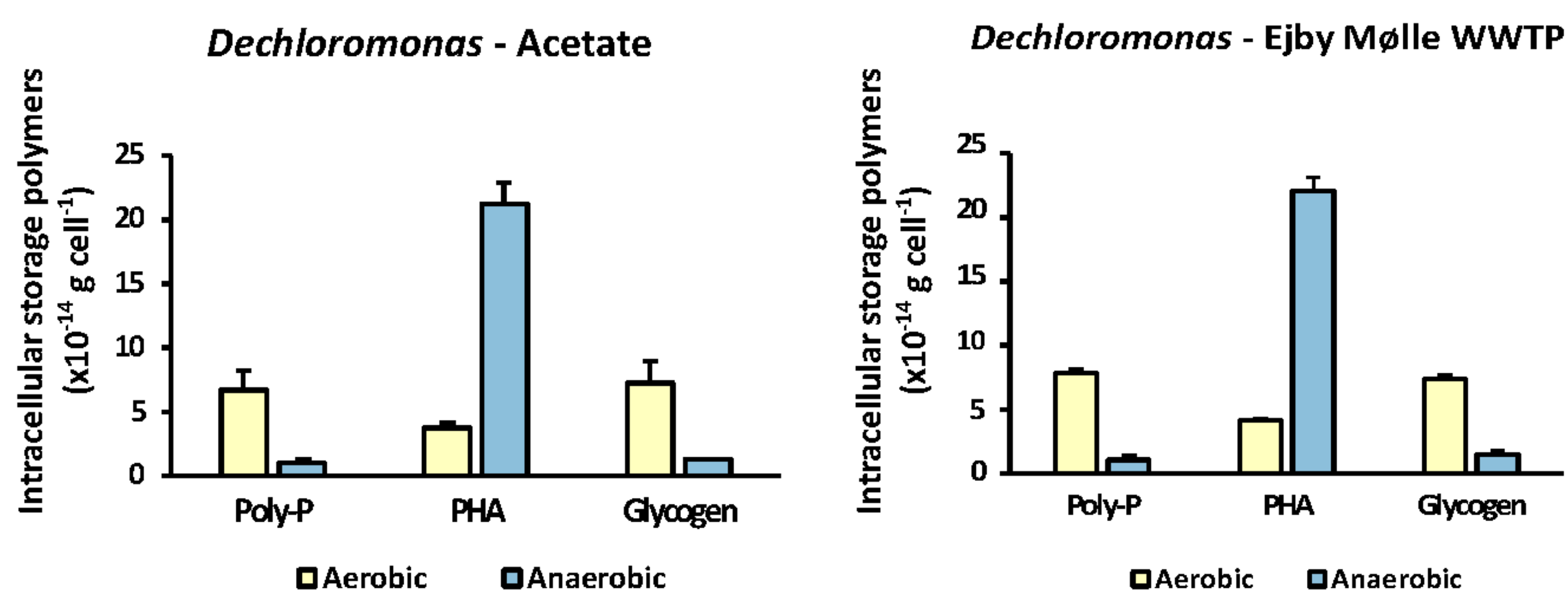


The 7 genomes retrieved showed potential for **poly-P**, **PHA** and **glycogen** storage.

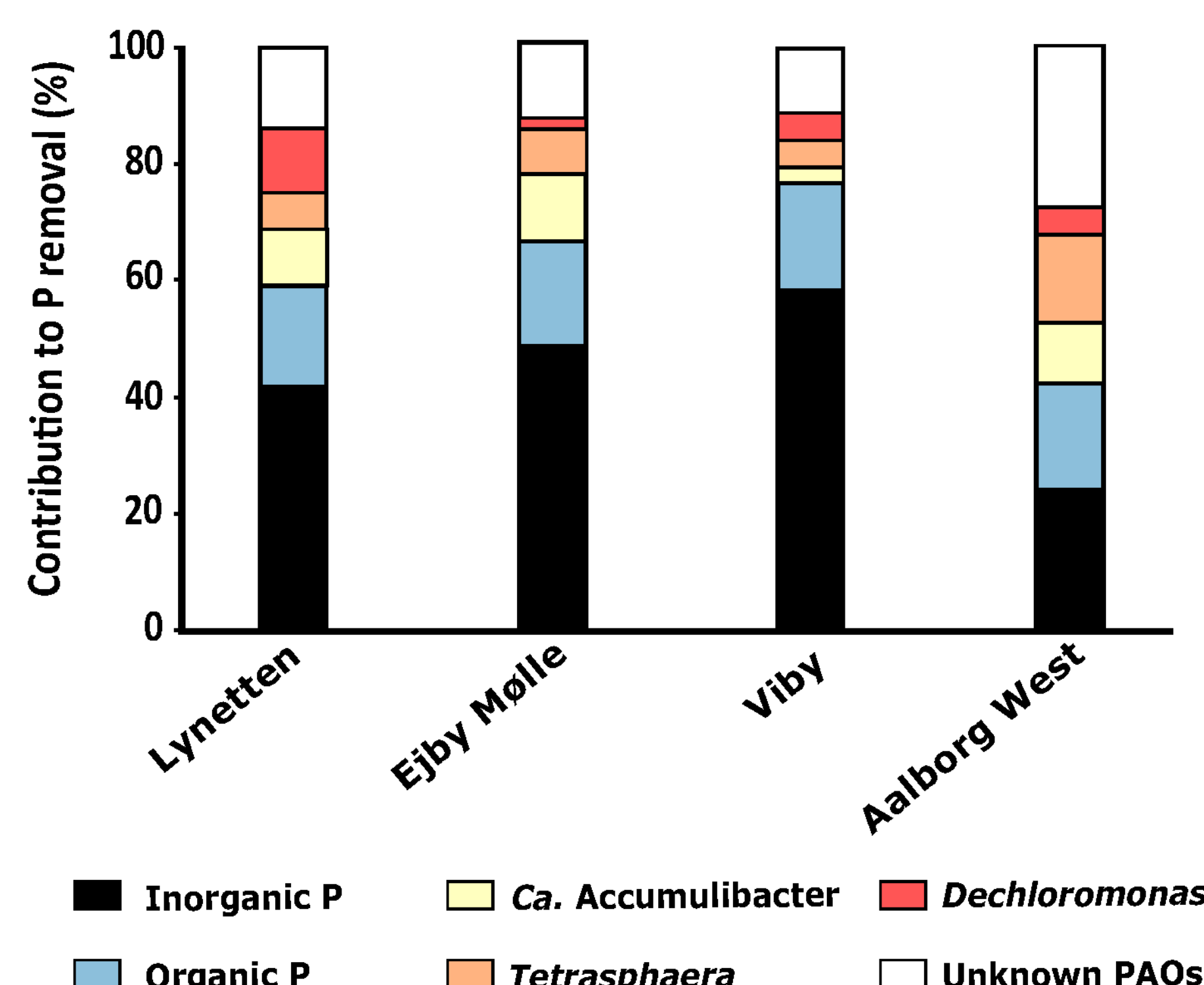
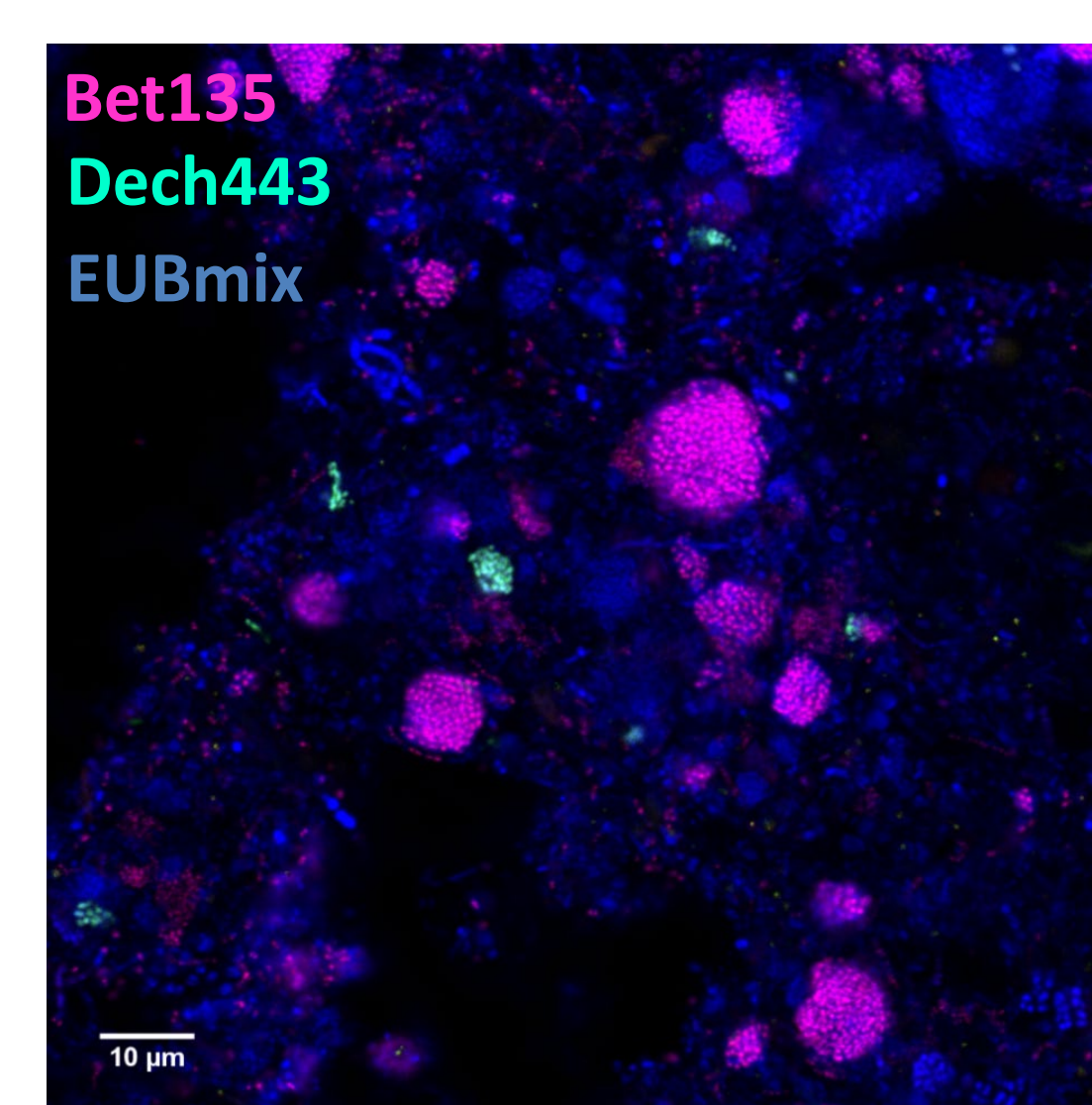
NOW WE KNOW IT!
Dechloromonas is an important PAO in full-scale EBPR WWTPs.

Dechloromonas in lab-scale P release experiments

The presence and dynamic behaviour of intracellular storage polymers was confirmed by **FISH-Raman** in *Dechloromonas* cells during P-release experiments, with mixed biomass from lab-enrichment and full-scale sludge.



Dechloromonas in full-scale WWTPs



The genus *Dechloromonas* plays an **important** role in P removal in full-scale EBPR plants.



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